

BUZ10

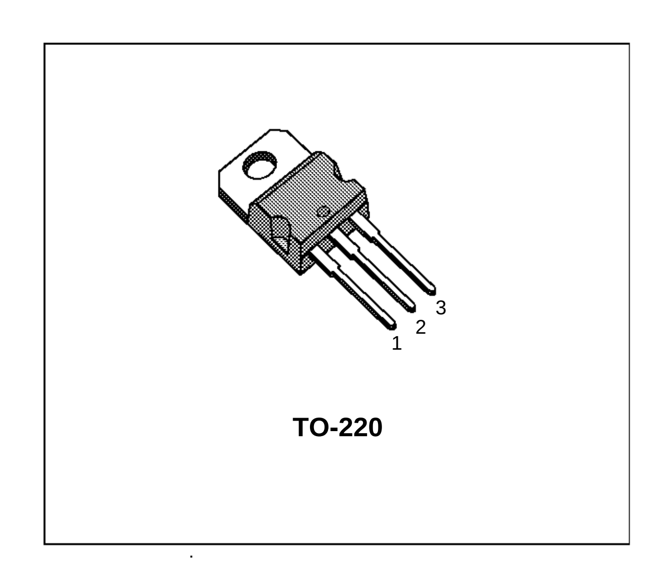
N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
BUZ10	50 V	< 0.07 Ω	20 A

- TYPICAL $R_{DS(on)}$ = 0.06 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- 175°C OPERATING TEMPERATURE

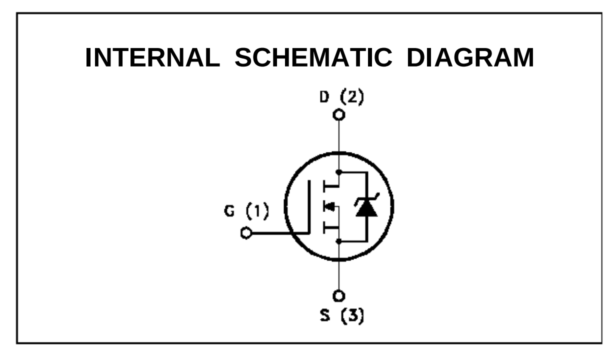
APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- REGULATORS
- DC-DC & DC-AC CONVERTERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- AUTOMOTIVE ENVIRONMENT (INJECTION, ABS, AIR-BAG, LAMPDRIVERS, Etc.)



TO-220

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	50	V
V_{DGR}	Drain- gate Voltage (R_{GS} = 20 kΩ)	50	V
V_{GS}	Gate-source Voltage	± 20	V
I_D	Drain Current (continuous) at T_c = 25 °C	20	A
I_{DM}	Drain Current (pulsed)	80	A
P_{tot}	Total Dissipation at T_c = 25 °C	80	W
T_{stg}	Storage Temperature	-65 to 175	°C
T_j	Max. Operating Junction Temperature	175	°C
	DIN Humidity Category (DIN 40040)	E	
	IEC Climatic Category (DIN IEC 68-1)	55/150/56	

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case Max	1.88	$^oC/W$
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient Max	62.5	$^oC/W$

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, δ < 1%)	20	A
E_{AS}	Single Pulse Avalanche Energy (starting T_j = 25 ^oC, $I_D = I_{AR}$, V_{DD} = 25 V)	80	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, δ < 1%)	20	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (T_c = 100 ^oC, pulse width limited by T_j max, δ < 1%)	14	A

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 μA V_{GS} = 0	50			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating T_j = 125 ^oC			250 1000	μA μA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20 V			± 100	nA

ON (∗)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ I_D = 1 mA	2.1	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V I_D = 13 A		0.06	0.07	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (∗)	Forward Transconductance	V_{DS} = 25 V I_D = 13 A	6	11		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25 V f = 1 MHz V_{GS} = 0		520 250 80	700 350 120	pF pF pF

SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on Time Rise Time Turn-off Delay Time Fall Time	V_{DD} = 30 V I_D = 3 A R_{GS} = 50 Ω V_{GS} = 10 V		45 65 115 80	65 95 160 120	ns ns ns ns



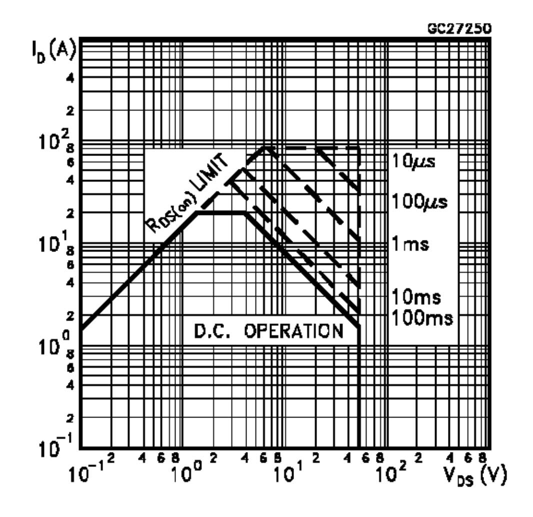
ELECTRICAL CHARACTERISTICS (continued)

SOURCE DRAIN DIODE

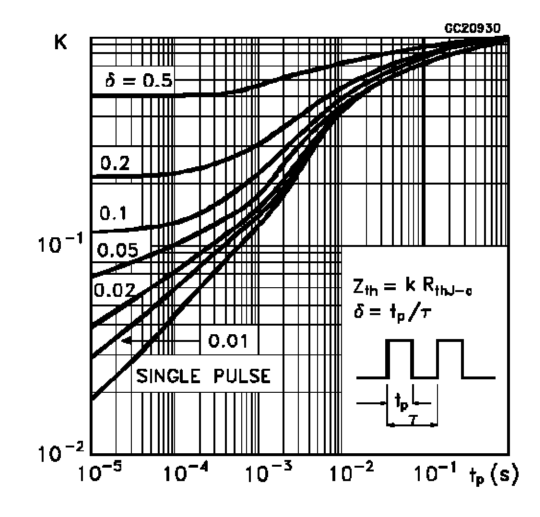
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}	Source-drain Current Source-drain Current (pulsed)				20 80	A A
V_{SD} (∗)	Forward On Voltage	I_{SD} = 40 A V_{GS} = 0			2	V
t_{rr} Q_{rr}	Reverse Recovery Time Reverse Recovery Charge	I_{SD} = 20 A di/dt = 100 A/µs V_{DD} = 15 V T_j = 150 °C		85 0.13		ns µC

(∗) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %

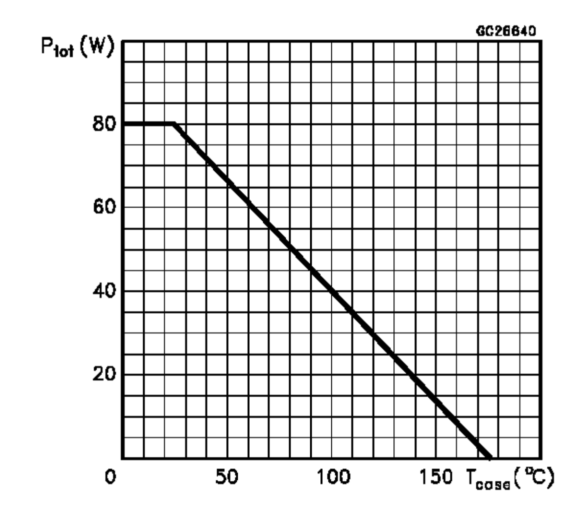
Safe Operating Area



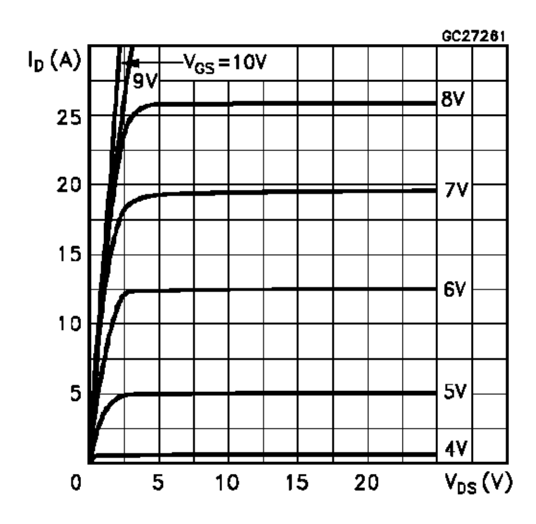
Thermal Impedance



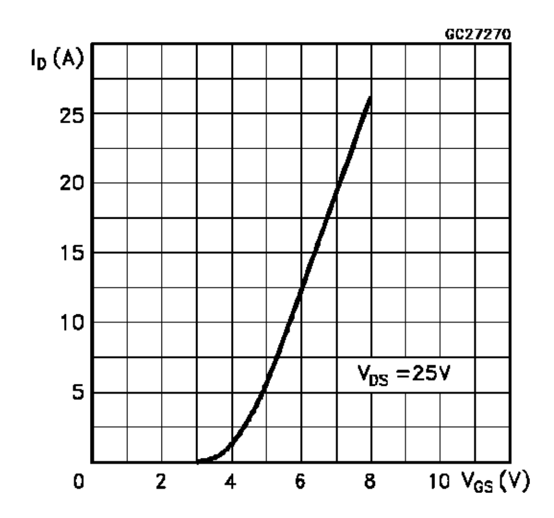
Derating Curve



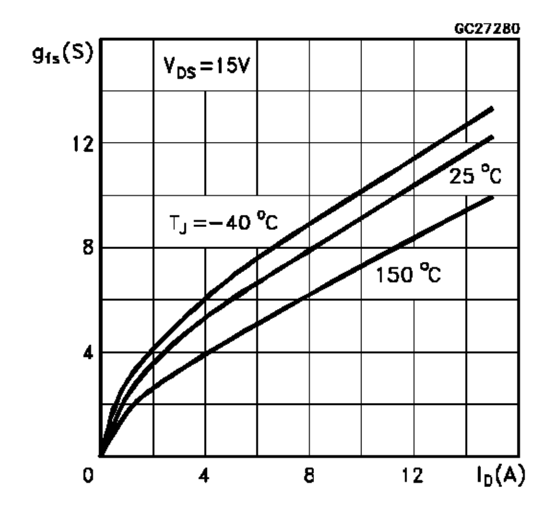
Output Characteristics



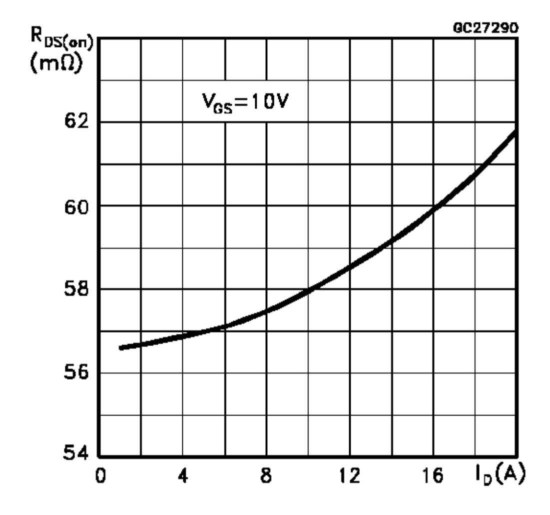
Transfer Characteristics



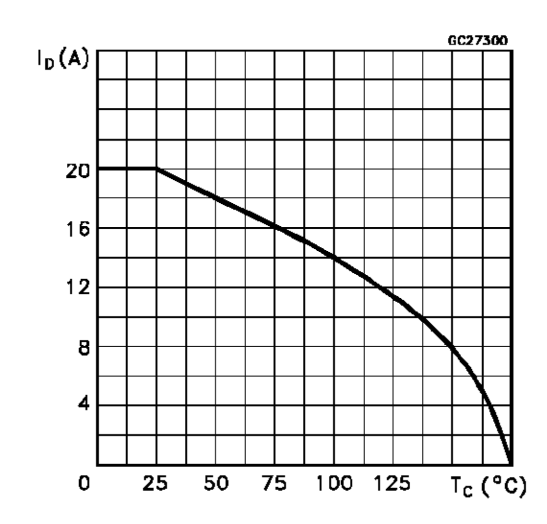
Transconductance



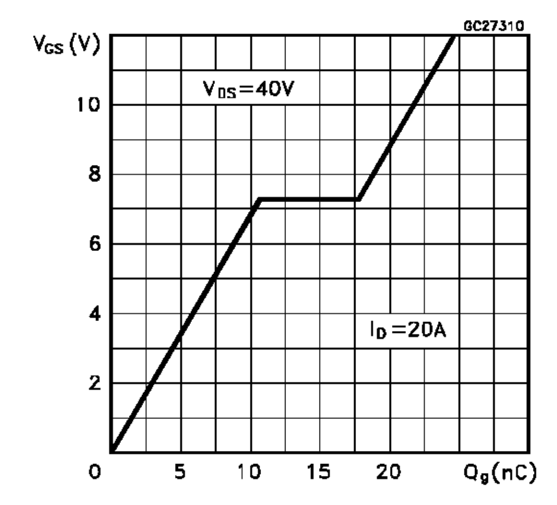
Static Drain-Source On Resistance



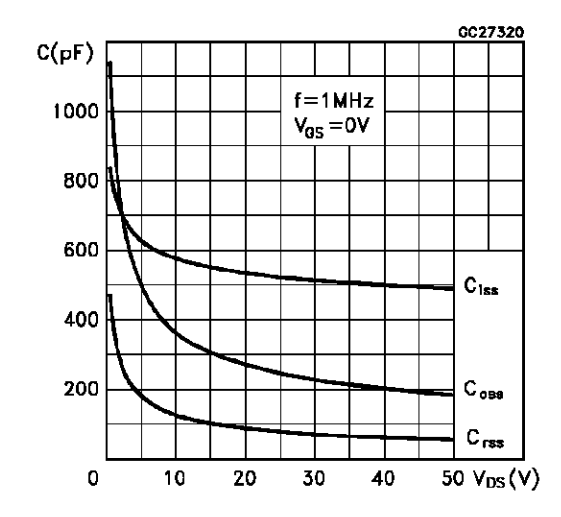
Maximum Drain Current vs Temperature



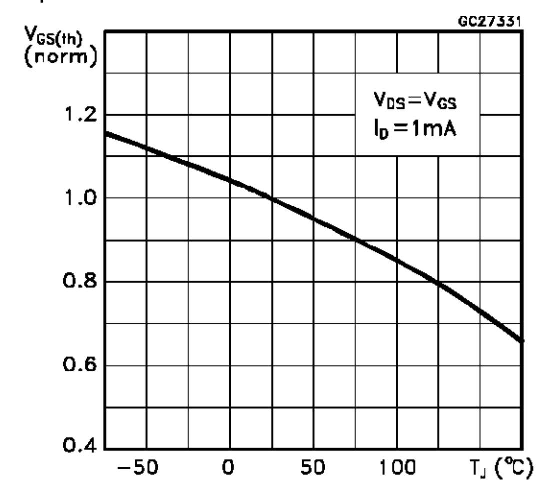
Gate Charge vs Gate-Source Voltage



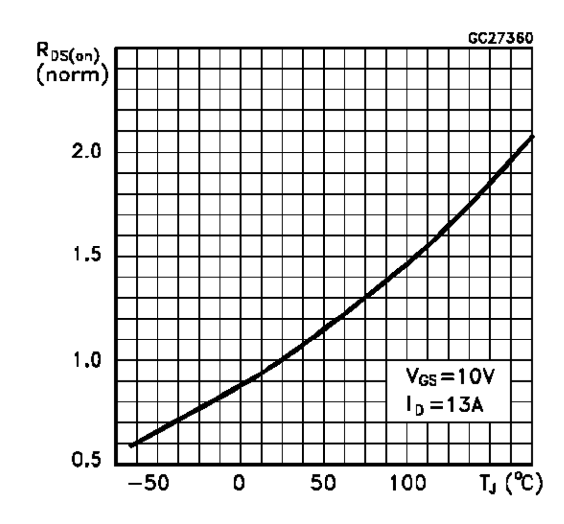
Capacitance Variation



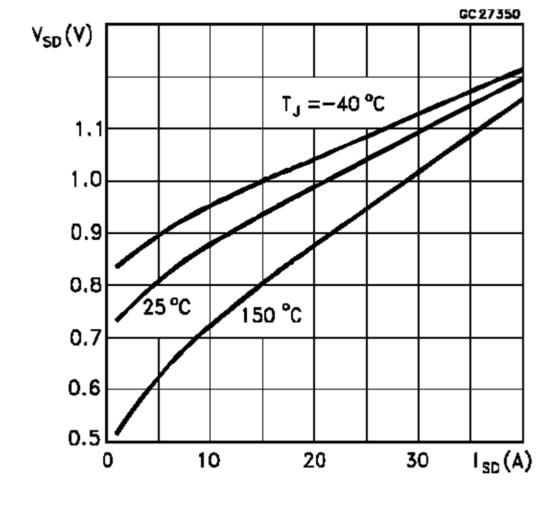
Normalized Gate Threshold Voltage vs Temperature



Normalized On Resistance vs Temperature



Source-Drain Diode Forward Characteristics



TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151

